Simplest Shortest Path First for Provisioning Optical Circuits in Dense Mesh Network Configurations

Abstract

A method for determining the shortest simplest path in an optical network with mixed DWDM transmission characteristics, mixed switching methodologies (i.e. micro mirrors, bubbles, Electronic TDM, Electronic cross bar, optical signal regeneration, and wavelength translation using optical devices). Disclosed in the invention is: a.) a multi-layered network path determination method that resolves over-constrained routing requirements, b.) an application of A that resolves routing constraints described for the optical networking environment, c.) A Dense Mesh simplification method that reduces the computation and processing power to find the best approximate path through the network, d.) A caching strategy to cache approximate paths, rather than exact paths, and to age out cache entries just before they become incorrect e.) A method of calculating multiple metrics and checking them against routing requirements during the path determination process rather than afterwards (as is done usually) f.) A method to turn an approximate path into an exact path that enforces simplest shortest path first and triggers cache age out, g.) A method of filling cache entries that enforces simplest shortest path first

The "Simplest path" has no signal regenerators, wavelength translators, or use of electronic switching. Slightly simpler paths require a minimum number of signal regenerators, wavelength translators, or electronic switching. In general terms it is a path that can be completed at the lowest level possible first and then progressively falls back to higher and higher levels to complete a path that meets routing requirements. "Simplest

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Shortest path" indicates that a longer path that is simpler has precedence over a "Shorter

path" that has additional resource requirements.